REMARKS

Claims 1-12, 14-18 and 23 are in the application, with Claims 14 and 18 having been amended, with Claims 13 and 19-22 having been cancelled, and with Claim 23 having been added. Claims 1 and 14 are the independent claims herein. No new matter has been added. Reconsideration and further examination are respectfully requested.

Applicants hereby affirm election of the claims of Group I for prosecution.

The title of the application has now been amended in accordance with the Examiner's suggestion.

The Examiner is thanked for pointing out informalities in the specification, which are corrected herein.

Claim Rejections under 35 USC § 102(b)

Claims 1-3, 5-10, 12 and 14-18 are rejected as being anticipated by Farnworth, U.S. Patent No. 5,739,050 ("Farnworth"). These claim rejections are respectfully traversed for reasons stated below.

Applicants first note that the process described in the Farnworth reference and the methods claimed in this application are directed to different purposes: Farnworth is concerned with assembling an IC die into a temporary package for testing, whereas methods claimed herein are for the purpose of handling an IC die to facilitate bonding of the IC die to a heat spreader. The difference in purpose between the process of Farnworth and the methods claimed herein is reflected by specific limitations of the claimed methods that depart from the teachings of Farnworth. It is respectfully submitted that these limitations of the claimed methods have not been taken into account by the Examiner.

Claim 1 is directed to a "method" which includes "picking up a clip with a chuck" and "while holding the clip with the chuck, picking up an integrated circuit (IC) die with the IC die in contact with the clip". Applicants wish to particularly emphasize the last limitation of claim 1, namely that the IC die is in contact with the clip when the IC die is picked up. Applicants submit that this limitation is not taught or suggested by Farnworth.

Farnworth does not go into detail concerning the picking up of the IC die 14 shown therein. At column 5, lines 9-11, the reference generally refers to the assembly tool 32 picking up the die 14, pressure plate 20 (which the Examiner considers to be a heat spreader) and bridge clamp 24 (which the Examiner considers to be a clip). However, from FIG. 6A, one of ordinary skill in the art would understand that the bridge clamp is picked up first by the assembly tool 32, followed by the pressure plate 20 and then the die 14. Most significantly, FIG. 6A shows the die 14 apart from, and thus not in contact with, the bridge clamp 24. Accordingly, one of ordinary skill in the art would understand from Farnworth that the die 14 is picked up with vacuum at the end of vacuum conduit 76 and without the die 14 being in contact with the bridge clamp 24, since the bridge clamp 24 is positioned well up along the vacuum conduit 76 at that time. Thus the method recited in claim 1 is different from that taught in Farnworth, since the method of claim 1 calls for the IC die to be picked up with the IC die in contact with the clip, whereas in Farnworth the die 14 is picked up without being in contact with the bridge clamp 24.

Applicants further observe from FIG. 6B that, even after the die 14 is installed on the interconnect 16 and the bridge clamp 24 is mounted on the package base 12, the die 14 is still not in contact with the bridge clamp 24. Rather, the pressure plate 20 remains interposed between the die 14 and the bridge clamp 24, and the force of the spring 22 is applied to the die 14 to keep the die 14 in place on the interconnect 16 only through the pressure plate 20.

For the foregoing reasons, it is respectfully submitted that the rejection of claim 1 should be reconsidered and withdrawn.

Claims 2, 3, 5-10 and 12 are dependent on claim 1 and are submitted as patentable on the same basis as claim 1. Further, at least some of these dependent claims recite limitations that support patentability of such claims on grounds independent of the patentability of claim 1. For example, claim 5 further recites "using the chuck to simultaneously place the clip and the IC die into juxtaposition with a heat spreader". In explaining the rejection of claim 5, the Examiner did not address the limitation that the chuck simultaneously places the clip and the IC die into juxtaposition with the heat spreader. In fact, it is applicant's view that Farnworth does not teach simultaneously placing the bridge clamp 24 and the die 14 in juxtaposition with the pressure plate 20 (which the Examiner considers to be a "heat spreader").

Initially, applicants refer the Examiner to the passage in the specification of the present application at page 5, line 27 to page 6, line 2. In that passage, the meaning of "in juxtaposition with the heat spreader" is specified. In particular, with respect to the clip, "in juxtaposition with the heat spreader" means "in position to hold the die in juxtaposition with the heat spreader". In turn, with respect to the die, "in juxtaposition with the heat spreader" means "positioned near or in contact with the heat spreader".

As indicated in FIG. 6A of Farnworth, the reference teaches that the assembly tool 32 places the die 14 in juxtaposition with the pressure plate 20 by picking up the die 14 at a time when the pressure plate 20 is already held at the end of the vacuum conduit 76. At that point in time, the bridge clamp 24 is already held by the assembly tool 32 but is located spaced well above and apart from the pressure plate 20 and the die 14. Thus, at that point in time, the bridge clamp 24 is not "in juxtaposition with" the pressure plate 20, since the bridge clamp is not then positioned to hold the die 14 in juxtaposition with the pressure plate 20. It is only at a later stage of Farnworth's process, after the die 14 has been installed on the interconnect 16, that the assembly tool 32 places the bridge clamp 24 in juxtaposition with the pressure plate 20 by installing the bridge clamp 24 in the package base 12. In other words, Farnworth's assembly tool 32 places the bridge clamp 24 in juxtaposition with the pressure plate 20 substantially later than Farnworth's assembly tool place the die 14 in juxtaposition with the pressure plate. Therefore, Farnworth fails to teach using a chuck to simultaneously place a clip and die into juxtaposition with a heat spreader, as recited in claim 5. It is accordingly submitted that claim 5 is patentable on grounds independent of the patentability of claim 1.

Such is also the case with respect to claims 6-10 which are all dependent, directly or indirectly, on claim 5. Further, it is believed that still further independent grounds of patentability apply to claim 7, which recites, "bonding the IC die to the heat spreader while holding the IC die in place on the heat spreader with the clip". While Farnworth arguably discloses holding its die 14 in place "on" the pressure plate 20 with the bridge clamp 24, it does not appear that Farnworth teaches bonding the die 14 to the pressure plate 20. Rather, it appears that Farnworth only holds the die and pressure plate together by the force of the spring 14. Indeed, as will be further discussed below with respect to claim 11, Farnworth's objective is to

form a temporary package for die 14, and it therefore would be contrary to Farnworth's purpose to bond the die to the pressure plate.

Claim 14 is the only other independent claim. Claim 14 has now been rewritten in independent form, but is unchanged in scope. Like claim 5, claim 14 recites, "using the chuck to simultaneously place the clip and the IC die into juxtaposition with a heat spreader". Accordingly, the remarks made above concerning the independent patentability of claim 5 are also applicable to claim 14, which is therefore believed to be patentable. Claims 15-18 are dependent on claim 14 and are submitted as patentable on the same basis as claim 14.

Claim Rejections under 35 USC § 103(a)

Claim 4 is rejected as being unpatentable over Farnworth in view of Levert et al, U.S. Patent No. 6,407,006 ("Levert").

Claim 4 is dependent on claim 1 and is believed to be patentable on the same basis as claim 1. In addition, claim 4 is believed to be patentable on grounds independent of the patentability of claim 1.

Claim 4 adds to the method of claim 1, the further limitation that "the IC die is in contact with a polymer pad that is part of the clip".

In explaining the rejection of claim 4, the Examiner proposes to modify the teachings of Farnworth by forming the pressure plate 20 of Farnworth of a polymer material to prevent damage to the IC die. However, even as so modified, Farnworth would not produce the method recited in claim 4, since the pressure plate 20 is clearly separate from the bridge clamp 24, and thus is not part of the bridge clamp 24. Thus the prior art combination proposed by the Examiner fails to satisfy the claim limitation of "a polymer pad that is part of the clip".

Claim 11 is rejected as being unpatentable over Farnworth in view of Fitzgerald et al. U.S. Patent No. 6,504,723 ("Fitzgerald").

Like claim 4, claim 11 is dependent on claim 1 and is believed to be patentable on the same basis as claim 1. Indeed, the arguments made above with respect to claims 5 and 7 are also applicable to claim 11 in view of the dependency of claim 11 on those claims. Moreover, claim 11 is also believed patentable on still another independent basis, set forth immediately below.

In rejecting claim 11, the Examiner proposed to modify the teachings of Farnworth by adding the step of reflowing a solder layer to bond the die 14 to the pressure plate 20. However, to so modify Farnworth would be directly contrary to Farnworth's intended purpose, which is to produce a temporary package for an IC for the purpose of testing the IC. If the die were soldered to the pressure plate 20, Farnworth's process would no longer work in the intended manner. It is therefore respectfully suggested that the Examiner's proposed modification of Farnworth's teachings is contrary to the prior art as a whole, and that the rejection of claim 11 should be reconsidered and withdrawn.

It is believed that the rejections of claims 5-10 and 14-17 under § 103(a) do not raise any further issues that require discussion, since applicants agree that pressure plate 20 may be considered to be a heat spreader, and since even so Farnworth fails to supply various limitations of the claims, as discussed above in connection with the rejections under § 102.

* * * * * * *

New claim 23 recites the same limitation as claim 5, but is dependent on claim 4. Through its dependency on claim 4, claim 23 is believed patentable both because Farnworth does not teach picking up a die with the die in contact with a clip (claim 1) and because Farnworth does not teach the die in contact with a polymer pad that is part of the clip (claim 4). Still further, considering the Examiner's rejection of claim 4 in which the Examiner proposes that Farnworth's pressure plate be formed of a polymer material, with such a modification the pressure plate could no longer serve as a "heat spreader" as proposed in the Examiner's rejection of claim 5[1]. Thus claim 23 is also believed patentable on grounds independent of the patentability of claims 1 and 4.

[1] In addition, as noted in connection with claim 5, Farnworth does not teach simultaneously placing a die and a clip in juxtaposition with a heat spreader.

CONCLUSION

Accordingly, Applicants respectfully request allowance of the pending claims. If any issues remain, or if the Examiner has any further suggestions for expediting allowance of the present application, the Examiner is kindly invited to contact the undersigned via telephone at (203) 972-3460.

Respectfully submitted,

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